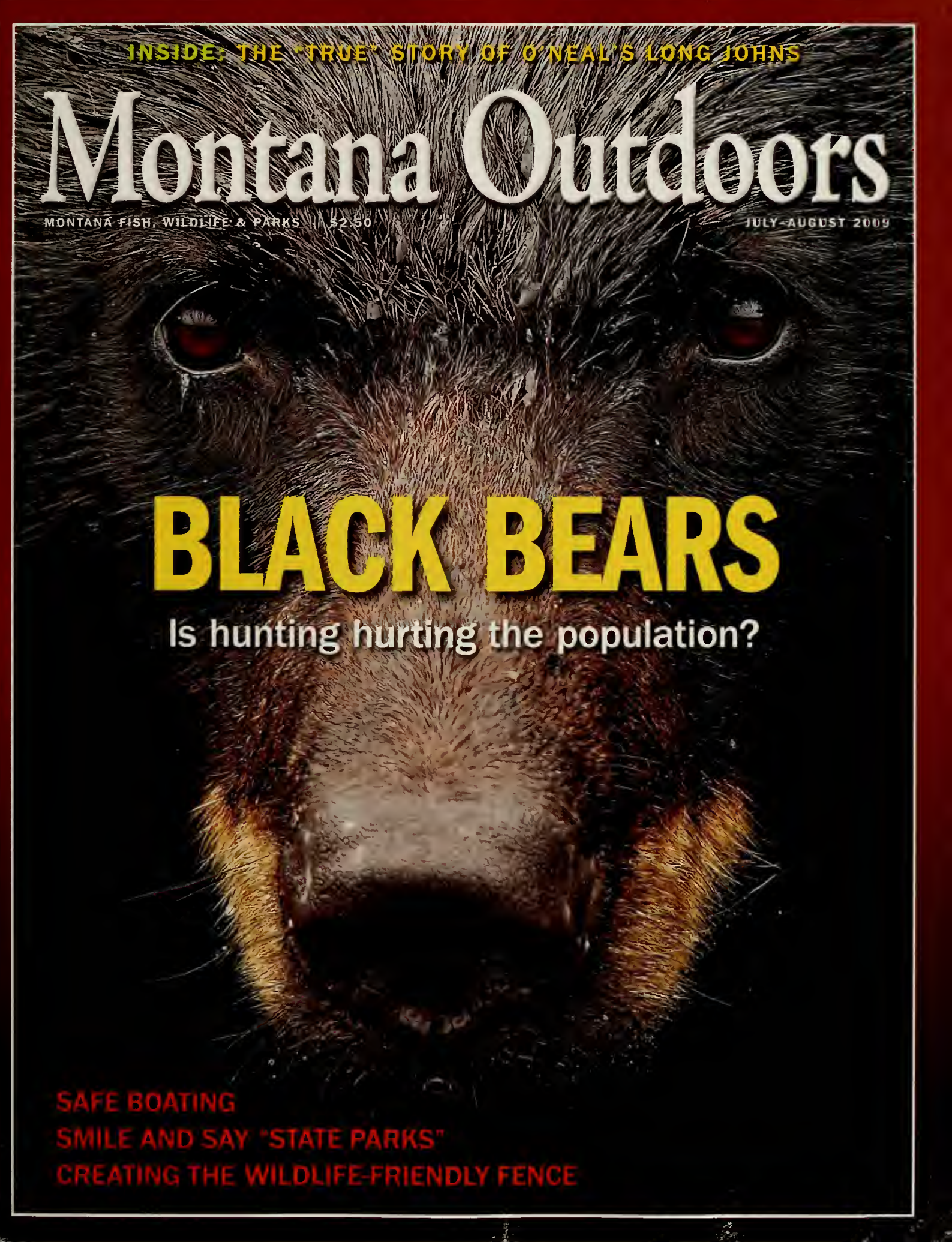
INSIDE: THE "TRUE" STORY OF O'NEAL'S LONG JOHNS

Montana Outdoors

MONTANA FISH, WILDLIFE & PARKS | $2.50 | JULY-AUGUST 2009



BLACK BEARS

Is hunting hurting the population?

SAFE BOATING

SMILE AND SAY "STATE PARKS"

CREATING THE WILDLIFE-FRIENDLY FENCE

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***MONTANA OUTDOORS* MAGAZINE**
VOLUME 40, NUMBER 4
For address changes or other subscription information call
800-678-6668

Montana Outdoors (ISSN 0027-0016) is published bimonthly by Montana Fish, Wildlife & Parks. Subscription rates are $9 for one year, $16 for two years, and $22 for three years. (Please add $3 per year for Canadian subscriptions. All other foreign subscriptions, airmail only, are $35 for one year.) Individual copies and back issues cost $3.50 each (includes postage). Although *Montana Outdoors* is copyrighted, permission to reprint articles is available by writing our office or phoning us at (406) 495-3257. All correspondence should be addressed to: *Montana Outdoors*, Montana Fish, Wildlife & Parks, 930 West Custer Avenue, P.O. Box 200701, Helena, MT 59620-0701. E-mail us at montanaoutdoors@mt.gov. Our website address is fwp.mt.gov/mtoutdoors.

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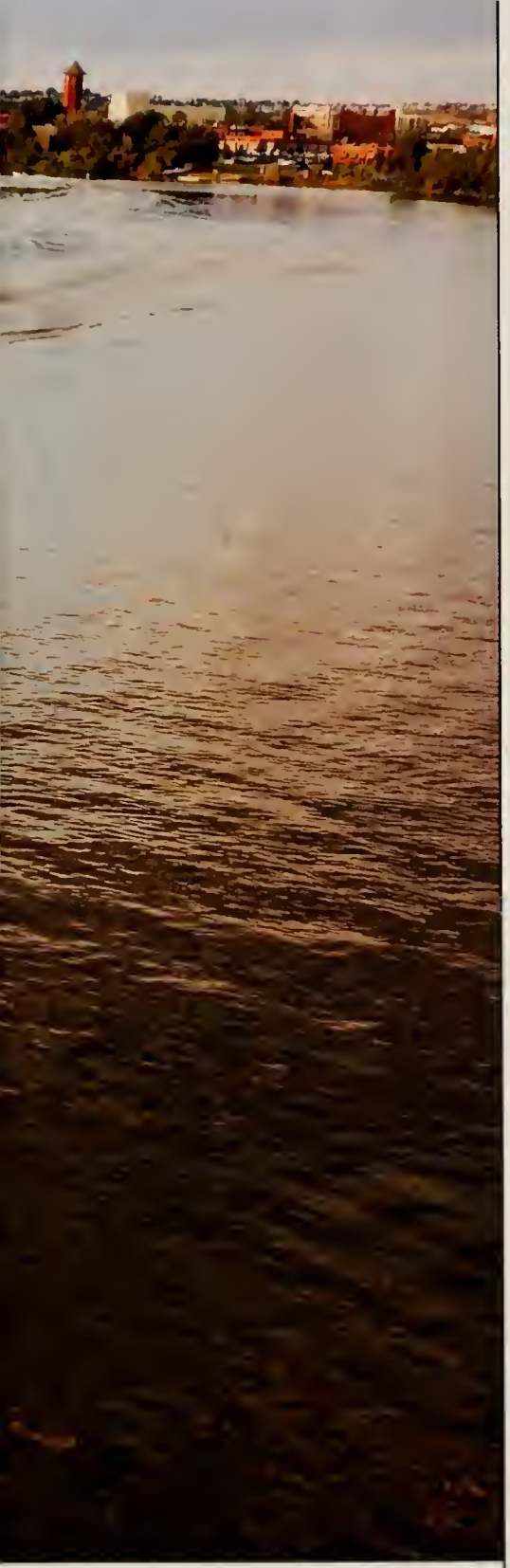
Postmaster: Send address changes to *Montana Outdoors*, Montana Fish, Wildlife & Parks, P.O. Box 200701, Helena, MT 59620-0701. Preferred periodicals postage paid at Helena, MT 59620, and additional mailing offices.



SAFE SCENE A kayaker shares the water with a powerboat and water-skier on the Missouri River in Great Falls. See page 24 to learn how boaters can avoid deadly accidents. Photo by Craig & Liz Larcom.

FRONT COVER See page 10 to learn what hunting is doing to Montana's black bear populations. Photo by Kenton Rowe.

Montana Outdoors

JULY–AUGUST 2009

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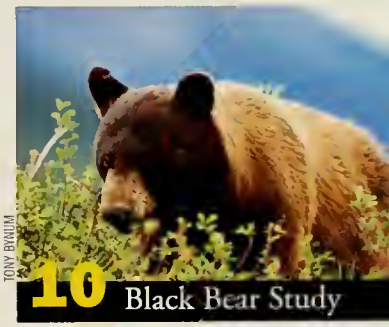
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Amazing cover

As always, the photography in your fine magazine is without parallel, especially the spectacular photo on the cover by Terri Reese. The cutthroat breaking the surface going after that mayfly is absolutely stunning. The timing and lighting are perfect. It is a breathtaking shot.

Bob Darling
Fort Benton

We received more comments on that remarkable cover photo than any in years. Many readers asked how the photographer was able to capture a cutthroat rising to a flying Trico, *a rare occurrence because generally trout won't expend that much energy for such a small insect. Terri Reese's husband, Bob Weselmann, explains that the pair was photographing cutthroats last summer in Yellowstone National Park—where they work as elk researchers—as the trout were breaking the surface to grab flying stoneflies. "Later, when reviewing the photos, I saw this one and said, 'Terri, would you look at this!' Because there had also been a* Trico *hatch, that particular fish must have come up for a* Trico *instead of a stonefly as we took the shot, and we didn't notice. But we knew when we saw the picture that it was awesome and might end up on a cover someday."*

Are hunting and eagles hurting goat populations?

I love Montana and cherish every opportunity to spend time in what I think is the most beautiful state in the country. However, your article on mountain goats ("Clinging to Existence," September–October 2008) upset me. If populations of mountain goats are declining and you don't know why, then quit issuing hunting permits until you gain a better idea of what's going on. Instead of killing them, use those goats to repopulate other areas. And if there is a theory that snowmobiles are disturbing goat populations, then prohibit snowmobilers from venturing into goat habitat until further studies are conducted. I've always been impressed by the lengths Montana FWP goes to in protecting wildlife and trout populations. Surely, when it comes to the mountain goat, you could apply a little common sense.

Doug Thomas
Lancaster, PA

One explanation for Montana's mysterious mountain goat population decline may be the increase in golden eagles. Many years ago, the state's eagle population was decreasing. Steps were taken to reduce the poisons in their food chain, and laws protecting eagles are strictly enforced. Mature eagles hunt and attack goat kids they find on cliff edges. They knock the kids off and eat them after they plunge to their death. With the low birth rates common in goat populations and manyfold increases in eagle populations, it is not surprising goats are losing the battle now.

Gary Stubblefield
Missoula

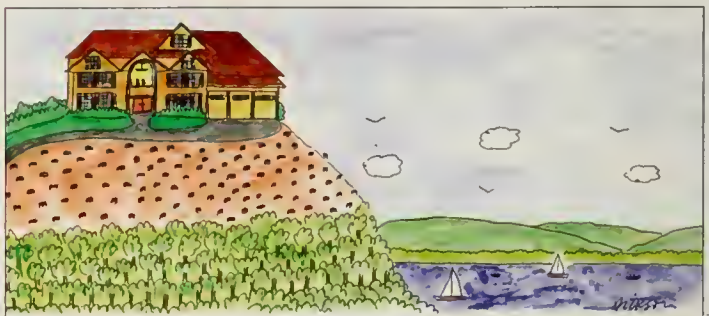
According to Tom Lemke, FWP wildlife biologist in Bozeman, the department uses the same wildlife management approach on goats as on other big game populations, which is to conserve habitat and carefully regulate harvest. The department has reduced hunting quotas in declining goat populations and closed seasons in several hunting districts where numbers have dropped dangerously low. Ending all goat hunting would not help Montana's overall goat population, because roughly the same number of goats killed by hunters would die anyway from predators, starving, and other natural causes. In some areas, like the Crazy Mountains, goat populations are growing—even with hunting harvest—and FWP is translocating some of those animals to the Rocky Mountain Front to boost ailing populations. As for snowmobiles, Lemke says there is not enough data showing they harm goat populations to justify closing areas to motorized use. Nor, he adds, is there enough information on eagle populations in goat habitat to make any meaningful speculations regarding the raptors' effects on goat numbers.

Too much information

I occasionally have the opportunity to browse your beautiful magazine. The falconry article in the March–April issue ("Grace from a Gloved Hand") interested me, as I have had the privilege to tag along a time or two with a local falconer while he was hunting ducks with his gyrfalcon and peregrine falcon. I have also assisted with the banding of migratory raptors in my area. When discussing my banding adventures, I always decline to share how the birds are captured, as I believe that the information shouldn't be common knowledge because it could be abused by unskilled or unauthorized individuals. Unfortunately, in your otherwise fine article, you did not seem to share my concern and included a description of a balchatri, or raptor trap. I'm one who feels that sometimes there is too much information available, and I lean toward caution.

S. A. Christiansen
Spokane, WA

Kate Davis, founder of the Raptors of the Rockies education center, responds: "It's an interesting concern, but any book or website on falconry gives details on trapping raptors—even blueprints for traps and nets. The trapping for banding that Mr. Christiansen took part in may have been with remote-release bow nets. Those are no secret either, though they are expensive to secure. I doubt anyone will run out and build a balchatri after seeing the Montana Outdoors *article on falconry."*



"Great view you've got up here, Richard. Too bad about everyone else's, though."

TOM DICKSON

Good news from the 2009 legislative session

The 2009 legislative session was another in which lawmakers debated dozens of bills affecting people interested in fish, wildlife, and state parks. Their often-impassioned discussions about hunting, fishing, and parks legislation showed the importance Montanans place on the resources this department is entrusted with managing and conserving.

Lawmakers passed many new laws affecting Montanans interested in fish, wildlife, and state parks. GEORGE LANE

Of the many bills that passed, we consider these among the most significant:

- Landowners may attach a livestock fence to a county road bridge as long as the fence is modified to allow anglers to get through to the river (see "Our Point of View," May–June) (HB 190).
- FWP will establish a citizen's advisory council and develop a strategic plan for managing pheasants, sharp-tailed grouse, and other upland game birds (HB 499).
- FWP may raise up to 750,000 trout and other coldwater fish at the Fort Peck Fish Hatchery, though rearing walleyes and other warmwater species will remain the facility's top priority. Starting in 2012, funding for the hatchery will come from general fishing licenses and federal funds (SB 425).
- Anyone who commits criminal mischief on FWP property, such as damaging signs or tipping latrines, will lose their hunting, fishing, and trapping privileges (HB 223).
- It is now unlawful to purposefully use feed to attract deer, elk, other ungulates, bears, or mountain lions (SB 202).
- Up to 500 nonresident elk-deer combination and 500 nonresident deer combination licenses will be available for adult nonresident family members of Montana residents (HB 585).
- Nonresidents attending college in Montana and former Montana residents attending college in another state may buy a big game license at the resident price (SB 185).

The department was particularly pleased with a bill that applies the good neighbor policy to all FWP lands. Sponsored by Senator Debby Barrett of Dillon, SB 164 requires that before FWP buys any new property, we must develop a noxious weed management plan for the site. The department must also set aside the equivalent of 20 percent of the purchase price, up to $300,000, to go into a land maintenance account. The account may be used to fund operations and maintenance on any FWP lands, including fishing access sites, wildlife management areas, and state parks.

This legislation will help FWP be a better land steward and neighbor. We'll use the fund to improve fencing and signage, grade roads, pick up trash, control weeds, and conduct other aspects of land operations and maintenance. The new fund will be particularly valuable for the state's 320-plus fishing access sites. In addition to the maintenance listed above, these FWP lands need boundary fencing, parking areas, boat ramps, latrines, and signs indicating recreational opportunities.

I like that this new legislation allows us to put additional resources on the ground so that FWP lands can benefit recreational users while not inconveniencing neighboring landowners. More recreational opportunities on public land with fewer impositions on private property—that's a combination hard to beat.

—Joe Maurier, *Director, Montana Fish, Wildlife & Parks*

For details on these or other bills passed by the 2009 Montana Legislature, visit http://leg.mt.gov and enter the bill number.

NATURAL WONDERS

ILLUSTRATION BY PETER GROSSHAUSER

Q. ***I read that we now have to buy a permit to take photographs at state parks. Is that true?***

A. Not for the vast majority of photographers. But since 2007, anyone taking photographs on any FWP lands for commercial sale must first purchase a $50 annual permit, which is good statewide for all state parks, fishing access sites, and wildlife management areas. For more information, visit fwp.mt.gov/parks/permits/commercialuse.html.

Q. ***I often see a gray jaylike bird on my mountain hikes. How can I tell if it's a gray jay or a Clark's nutcracker?***

A. The birds look similar at a distance. Both are the same size, roughly 12 inches from head to tail tip, and both live in western Montana mountains. The main physical differences:

Gray jay: This species has a gray tail, gray wings, a white forehead, face, and neck, and a short bill. (It is quite bold and will often enter campsites and come close to hikers if it thinks they have food.)

Clark's nutcracker: This bird has a mostly black tail and wings, a gray belly and head, and a longer bill.

Montana's trout fishing season

DENVERBRIAN.COM

kicks off with—get this—water

Streams across western Montana ran high and muddy from melting runoff on the May 16 trout fishing opener. That's a big change from much of the 2000s, when paltry spring snowpack left streams low and clear on opening weekend.

Though it makes for tough early season fishing, above-average snowpack across western Montana bodes well for stream conditions and reservoir levels this summer. Thanks to abundant water flow and moderate temperatures last summer, FWP did not need to impose heat-related angling restrictions, common in previous years to protect fish from stress caused by warm water and low flows.

"There's no way to predict this summer's temperatures and rainfall," says Chris Hunter, chief of FWP Fisheries. "But as of June we had great snowpack throughout all mountain ranges, and that sure looks promising for river flows and temperatures during the warmer months."

How they spent your fishing license dollars in 2008

Anglers interested in what FWP does to improve fishing and conserve fisheries can find out in the department's annual "Fishing Newsletter." This year's 52-page booklet provides highly readable accounts from local biologists on key management activities and top fisheries issues in 2008.

A brief sample of what you'll find in the booklet:

- Northwest region fisheries manager Jim Vashro reports on fishing access secured by The Nature Conservancy's purchase of 110,000 acres of Plum Creek Timber Company land for eventual transfer to public land management agencies.
- Ladd Knotek, fisheries biologist in Missoula, writes of landscape-level habitat conservation work in the Clearwater River drainage, home to critical bull trout and westslope cutthroat spawning waters.
- Pat Clancey, fisheries biologist in Ennis, reports on the mysterious fall run of rainbow trout in the Madison River.
- Walleye numbers on Hauser Lake are abnormally high, creating hungry but stunted fish, writes Eric Roberts, fisheries biologist in Helena.
- Dave Yerk, fisheries biologist in Choteau, highlights the excellent walleye fishing on Tiber Reservoir east of Shelby.
- Anne Tews, fisheries biologist in Lewistown, reports on small fishing reservoirs in her area.
- On the Bighorn River, fisheries biologist Ken Frazer reports on yet another great year of trout fishing but points to potential problems in the future.
- Fort Peck fisheries biologist Heath Headley reports on the benefits of increased water levels on the giant reservoir.

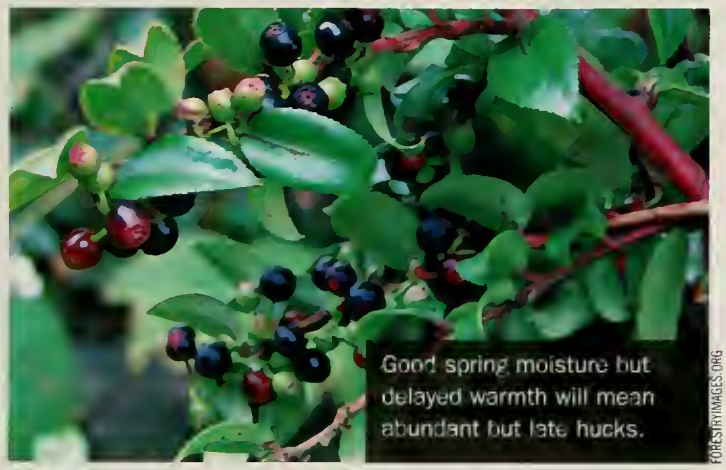
And that's just for starters.

For a copy of the booklet, call (406) 444-2449 or write to fwpfsh@mt.gov. For an electronic version, visit fwp.mt.gov and look for the link on the Fishing page.

Left: A fisheries technician displays a 10.3-pound walleye, one of several large fish netted from the Missouri River as part of ongoing fish population assessments.

Right: Fisheries crews use electroshocking equipment to sample fish populations in tributaries of the upper Clark Fork River. The assessments help biologists see how fisheries change over time.

PHOTOS BY MONTANA FWP



Good spring moisture but delayed warmth will mean abundant but late hucks.

FORESTRYIMAGES.ORG

Break out the berry buckets

FWP's resident unofficial huckleberry expert predicts 2009 will be a great summer for picking the tasty purple fruits. "It's been my experience over the past 35 years that when we have good moisture like we've had this spring, we see fatter and juicier berries," says Ellen Bryson, who works in the FWP Human Resources Bureau. Abundant spring rains and snowpack should keep soil moist, which Bryson and other huckleberry harvesters say increases berry production in northwestern Montana, home to the state's most abundant patches.

Montana's primary huckleberry region is in the Flathead and Kootenai national forests from Yaak to Lincoln. Festivals in Trout Creek, Whitefish, and Seeley Lake honor the purple berry each year.

Bryson, whose license plate reads "HCKBRY," says cool spring weather will likely delay huckleberry growth. "Usually I'm well into it by mid-July, but this year I think the peak will be late July to early August," she says. At higher elevations on north-facing slopes, huckleberries can remain abundant until early September. Though conditions look good for this summer, Bryson thinks they likely won't top 2008. "Last year I had the longest huckleberry season of my life," she says. "The odds of two phenomenal years coming back-to-back are not high."

Looking for trash, he finds an ice age bison skull

Ryan Sokoloski, manager of Makoshika State Park near Glendive, was picking up litter last August when he saw what looked like a big tree root. It turned out to be a partial bison skull, buried along the edge of a coulee. The skull contained the forehead, an eye socket, most of one horn, and a stub of another. Rain had washed soil away, exposing the animal relic.

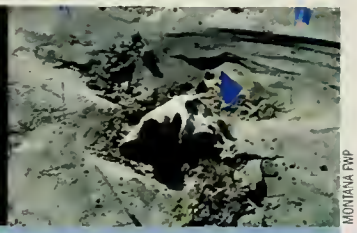
Bison skulls are not earth-shattering finds in a region where millions once roamed, so Sokoloski didn't think much of his discovery. Then a few weeks later he received a visit from Max Martell, a Lakota-Sioux who lives in the Glendive area and regularly visits Makoshika. Martell looked at the skull, sitting on the counter of the park's visitor center. "So, you found the big one, *Bison antiquus*," said Martell, who studies Paleo-Indian history. *Bison antiquus* were common 10,000 to 20,000 years ago during the last ice age. Sokoloski realized he might not have found an ordinary bison skull after all.

He called Sara Scott, FWP Parks Division Heritage Resource Program manager, who had the skull sent to the University of Montana Zoological Museum in Missoula for positive identification. David Dyer of the university's Zoology Department confirmed Martell's hunch.

Bison antiquus were 15 to 25 percent larger than modern bison and roamed much of North America. Other large wildlife inhabiting the region during that time include the mammoth, saber-toothed cat, camel, dire wolf, and short-faced bear. Dyer told Sokoloski that only a few other records of the ancient bison exist in Montana.

See the rare ice age skull for yourself at the park's newly refurbished visitor center. And don't miss the dinosaur fossils at the center and scattered about the surrounding badlands. For directions and hours, call (406) 377-6256 or look for Makoshika on the Parks page of the FWP website, fwp.mt.gov.

Right: the skull of a *Bison antiquus* found at Makoshika State Park last year. Below: an artist's depiction of a smilodon (saber-toothed cat) attacking *B. antiquus* 15,000 years ago.



MONTANA FWP

ILLUSTRATION BY CARL BUELL

When **Tim Christie** heard from a photographer friend last summer that a pair of western bluebirds was nesting not far from where he was camped in the Kootenai National Forest, he drove straight there. "I love photographing bluebirds, especially the nests," says Christie, a native Montanan who now lives in Coeur d'Alene, Idaho, and photographs regularly in this state. "The nest was about 7 feet up in a tree, and the male and female would perch on some dead branches on the ground as they flew to and from the nest. When bluebirds are feeding their little ones, they constantly shuttle back and forth, and there's a lot of activity. I set up my blind about 25 yards away, making sure I didn't interfere with the birds. Then I sat down and began taking photographs. That's when I noticed the lupine in the background behind the male as he perched on a branch, and I thought it made for a real nice picture."

BE PREPARED
(for Wildlife Encounters)

Girl Scouts, Boy Scouts, and others teach youngsters how to avoid conflicts with bears, cougars, and other wild animals.

BY VIVACA CROWSER

As I round the corner, I spy a bear cub just to the right of the trail. I know it's only a taxidermy mount—carefully nestled into position among the ponderosa pines—but in my mind I pretend it's alive: Has it seen me? Should I back away slowly? Run while it isn't looking? Where is the mom?

These are questions several Girl Scouts waiting nearby are hoping I will ask. And they have answers.

The Scouts, stationed along this wildlife safety trail, are teaching me and the 7- to 9-year-old students I am with how to avoid conflicts with wildlife. "Is this a grizzly or a black bear cub?" one student asks. A Scout explains how to tell the difference: Grizzlies have a dish-shaped face profile, humped shoulders, and small, rounded ears. Do not rely on color or size, she explains. Black bears can be brown, and grizzlies sometimes appear black. Young grizzlies can be smaller than adult black bears.

A few minutes later, along the same trail, students encounter "fresh" mountain lion tracks in mud and a "rattlesnake" hidden under a log. One Scout explains that lion tracks indicate the animal may be nearby and the group needs to keep an eye out and stay close together. Another Scout tells the children to be careful when stepping over logs and rocks, where rattlesnakes sometimes hide. As long as people leave snakes alone, she says, they pose no danger. These and other simulated encounters help students learn to avoid conflicts with real wildlife.

It's not often you run into high-schoolers teaching grade-school students how to be safe around grizzly bears, poisonous snakes, and other potentially dangerous wildlife. Chuck Bartlebaugh hopes it becomes commonplace. Bartlebaugh is director of the Missoula-based Center for Wildlife Information (CWI). He created the Be Bear Aware and Wildlife Stewardship Campaign, which spreads information across North America on how to safely live and recreate in areas where bears and other wildlife live.

One tool in the campaign is the portable wildlife safety trail, which can be set up either indoors or outdoors. The trail is part of Bartlebaugh's innovative Train the Trainer Program, which teaches people to instruct others about wildlife safety. "There's no way a nonprofit like ours, or public agencies like Fish, Wildlife & Parks, could ever have enough staff to reach all the people out there who want to learn about wildlife safety," Bartlebaugh says. "So we provide adults and young adults like Girl Scouts and Boy Scouts with training and presentation skills so they can teach younger people in schools and clubs the right ways to avoid conflicts with wildlife. It leverages the knowledge and teaching techniques we've developed to reach many more people."

Bartlebaugh adds that kids who take part in the wildlife safety trail are encouraged to share what they learn with friends and family members. "The trail is a tangible way to learn about living with wildlife and then pass the message on to others," he says.

Government conservation agencies and wildlife-related nonprofits such as FWP, the Interagency Grizzly Bear Committee, the

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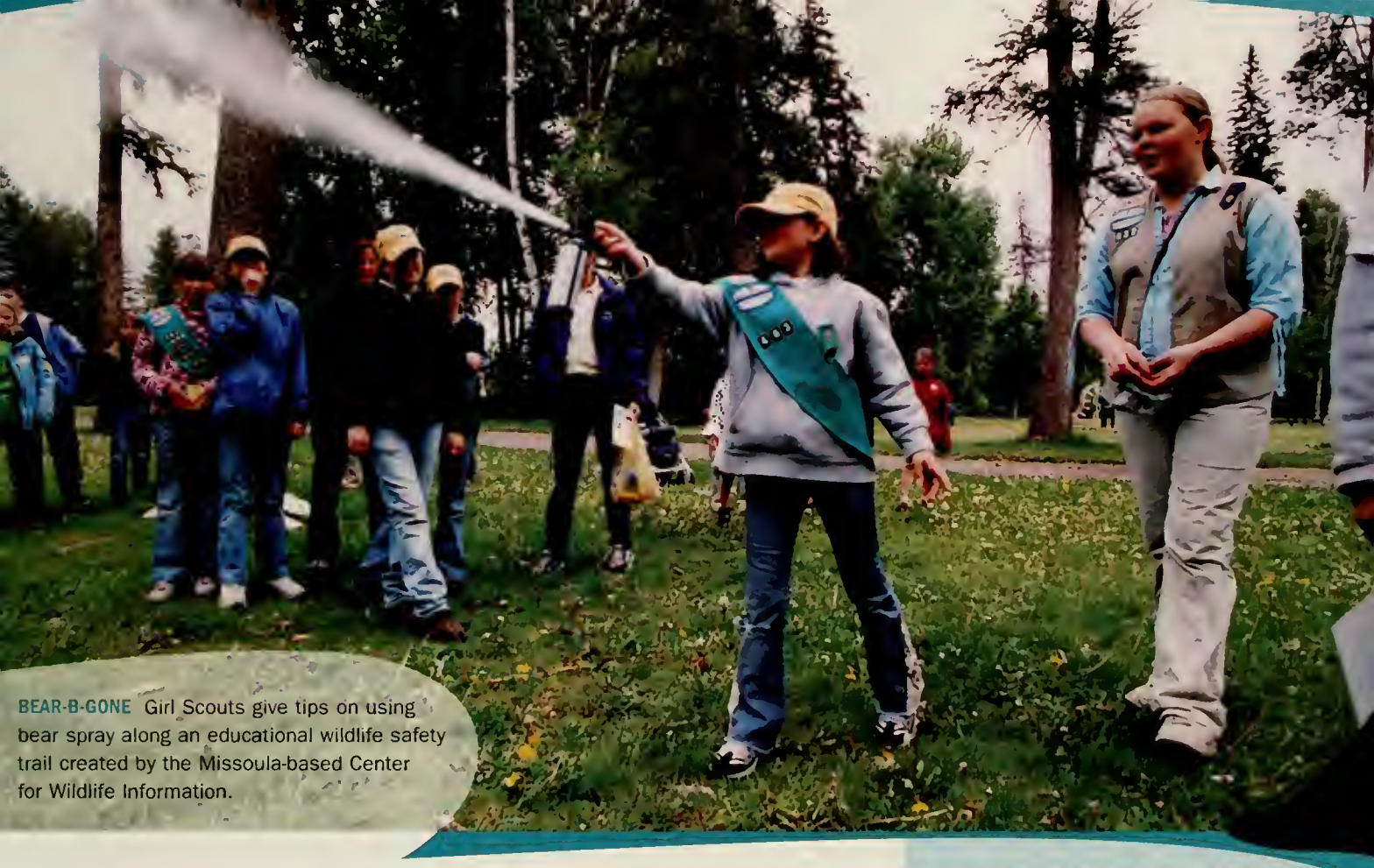
Vivaca Crowser manages the FWP regional Information and Education Program in Missoula.



BEAR-B-GONE Girl Scouts give tips on using bear spray along an educational wildlife safety trail created by the Missoula-based Center for Wildlife Information.

Great Bear Foundation, Safari Club International, Wildlife Forever, Defenders of Wildlife, and the Rocky Mountain Elk Foundation helped fund the wildlife safety and stewardship campaign.

Bartlebaugh says public interest in wildlife safety is growing as more and more people move into Montana and build homes in what was previously wildlife habitat. "Many new residents are from cities and don't know how to coexist with large wildlife such as bears," he says.

Boy Scouts and Girl Scouts have been ideal for delivering wildlife safety messages to others, says Jim Atkinson, a board member with the Montana Council for Boy Scouts of America. "Older Scouts communicate the message well to their peers and younger school groups. And their efforts can help them earn merit badges and achieve leadership positions," he says.

In response to growing public demand for information on wildlife safety, the Scouts worked with the CWI and FWP to create a "traveling classroom." It's a trailer filled with props—wildlife mounts, skulls, tracks, camping gear, wildlife-resistant food storage boxes—used for the wildlife safety trail. The trailer also houses stand-up displays, brochures, and other educational tools. Shawnee Allison, a Girl Scout in Missoula, helped create the traveling classroom by developing a list of educational contents and then finding a trailer to store the items. "I wanted something that would make it easier for the wildlife safety message to reach more people in more places," Allison says. Funding and wildlife mounts came from FWP, The Pittsburgh Foundation, and the United Taxidermy Association. For her contribution to the project, Allison received a Gold Award—the Girl Scouts' highest honor.

Bartlebaugh says the trailer has been an effective way to deliver wildlife awareness messages to communities across western Montana. He has met with various wildlife agencies and organizations in Montana, Idaho, Wyoming, and Washington to discuss how they might fund additional trailers. "People all over the West want information on how to live peacefully with bears and other wildlife," he says. "Trailers like this are a great way to take that information to fairs and other places where people gather."

MEMORABLE ENCOUNTER Children inspect a black bear mount on the wildlife safety trail while learning how to avoid dangerous encounters. Below: Girl Scouts set up an information display transported in a new education trailer.

ONE BEAR OF A STUDY

It took nine years, hundreds of volunteers, and four computer hard drives, but FWP researchers now know how hunting affects black bear populations.

BY TOM DICKSON

Things looked grim for Montana black bear hunters and managers during the early 1990s. Environmental groups had shut down the state's grizzly bear hunt by arguing successfully in federal court that Fish, Wildlife & Parks lacked data to prove hunting harvest was not reducing the population. The Fund for Animals was threatening to push for a statewide voter initiative to outlaw spring black bear hunting in Montana. And in Oregon, Colorado, and several other states, animal rights groups were successfully restricting bear hunting seasons.

FWP biologists had gathered and studied extensive reports on black bears from previous research in Montana, Idaho, and other states. But they knew the information was inadequate for producing a sound management strategy. "We were basically managing black bears by the seat of our pants," says Gary Olson, FWP wildlife biologist in Conrad, who wrote the department's bear management plan in the early 1990s. Biologists knew the age and sex of harvested bears, harvest totals, hunter success rates, and how many days on average it took to kill a bear. But they lacked the most critical information: the number of bears living in the state's 25 bear management units (BMUs), the percentage of each BMU population that hunters killed (harvest rate), and the sustainability of harvest rates. In other words, they didn't know if hunters were killing more bears each year than the population could support.

The lack of critical information concerned biologists, because they are charged with ensuring the health of Montana's wildlife populations. "We thought we might be killing too many bears in some districts and maybe should be restricting harvest," says Olson. The department's data gaps also made black bear hunting vulnerable to lawsuits by animal rights groups. Other states were being forced to restrict their bear hunting seasons. Would Montana be next?

KEEPING CLOSE TABS ON BEARS

Black bears are a charismatic species found throughout North America. Though often overshadowed in Montana by the widely publicized grizzly, *Ursus americanus* is a popular big game animal sought by photographers, wildlife watchers, and roughly 11,000 hunters who buy licenses each year.

Black bears are smaller than grizzlies, weighing an average of 100 to 300 pounds compared to the grizzlies' 300 to 600-plus pounds. Their ranges overlap in several parts of the state, notably in and around Glacier and Yellowstone national parks. The bears coexist, though grizzlies will kill smaller black bears. As with grizzlies, female black bears are

POPULATION DRIVER Because female black bears sustain populations, Montana has taken steps to reduce their kill by hunters. To find out if the restrictions are sufficient, FWP biologists conducted a nine-year study on black bear mortality and reproduction.

roughly 20 percent smaller than males. The species' name is misleading: In western states, coat color ranges from black to cinnamon to honey blond. Black bears range throughout western Montana and east to the mountains around Lewistown and southeast to the Custer National Forest surrounding Ashland.

Though the black bear was considered a varmint in many states until the 1940s and '50s and could be shot on sight, Montana designated it as a big game species in 1923 with protection of regulated hunting seasons and limits. Hunting with dogs was banned, as was shooting bears lured to bait—practices still allowed in many states. Later, as part of the state's new black bear management plan, Montana adjusted the spring hunting season so hunters were less likely to encounter females with cubs. Females, known as sows, emerge from hibernation several weeks later than males. Reducing female bear harvest also lessened cub orphaning.

Montana's overall black bear population appeared in no danger of overharvest. Hunter numbers had remained relatively stable over the previous 20 years, as had statewide bear harvest. But harvests were increasing in some BMUs. To find out if harvest rates were sustainable, the department assigned FWP research scientist Rick Mace to learn more about black bear mortality and reproduction by intensively monitoring a single large representative population. From 2000 to 2004, Mace and his mostly volunteer assistants trapped and tranquilized 146 black bears in the Swan Valley, fitted them with radio transmitter collars, then used telemetry to track the animals. When a bear stopped moving for a certain length of time, indicating it had died, biologists rushed to the site to learn what caused the death. Researchers also looked for hibernating bears in dens to learn when the animals began and ended hibernation, how many cubs females produced, and at what age they reproduced.

Tom Dickson is editor of Montana Outdoors.

INACCESSIBLE Mace's initial study required checking black bear dens. But the sites, like this cliffside den, were often impossible for study crews to reach.

"We got some valuable information, but not all our efforts were successful," says Mace, who is based in Kalispell. Particularly frustrating was reaching den sites, more than 80 percent of which turned out to be in trees, cliffs, or other hard-to-reach places, says Tonya Chilton, who began working for Mace as a University of Montana graduate student and was later hired to assist with the bear project. "There were all kinds of crazy den locations, like one that was 80 feet up an old cottonwood tree with loose bark and a swaying trunk that made it impossible for us to climb," she says. Dense cover added to the researchers' difficulties. During several hundred flights to check 1,031 different bear locations indicated by radiotelemetry, observers saw only nine bears.

READING THE HAIR

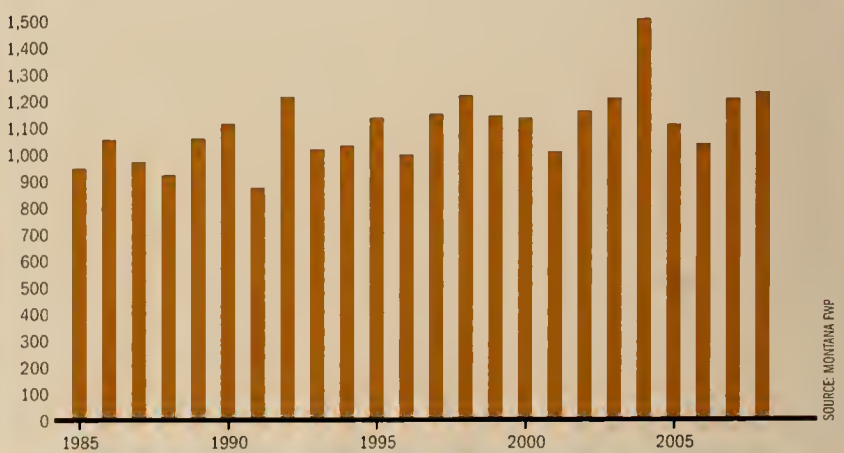
After two years working in the Swan Valley, Mace realized he needed to devise a bear survey technique that would provide harvest rate information faster. The internationally renowned bear biologist knew of colleagues worldwide using new DNA technology to survey bear populations. "I sat in my office for days figuring out a way to make [the technology] work to estimate hunter harvest rates in Montana," he says.

One way biologists determine harvest rates is to count all animals in an area and divide

QUALITY HUNT Each year 11,000 hunters kill roughly 1,200 bears, half in the state's northwestern region. Though the roughly 11 percent success rate is relatively low, most hunters say they are satisfied with the quality of bear hunting that Montana provides.

Black bear harvest 1985–2008

Over the past 24 years, Montana's black bear harvest has remained steady, with no major declines. Biologists have long suspected that the statewide population was sustaining existing harvest. But to be certain, they needed to determine the annual harvest rate—the percentage of the population that hunters kill each year.



the harvest number by the population number. But accurately counting bears, which live in dense brush and timber, is nearly impossible. Another way is to use a simple statistical formula: Identify, or mark, a large sample of bears in an area, then divide the number of the marked bears that hunters harvest by the original number. The challenge with this method is identifying individual animals. For years biologists have trapped bears and given the animals an ear tag or other marker. But the procedure is expensive, dangerous for trappers, and stressful to bears. More painless and effective is to "trap" bear hair and analyze its genetic code to identify individual animals. That's what Mace decided to do, on a monumental scale.

Whereas the Swan Valley study looked at a single bear population, Mace devised his new DNA project to survey black bear populations across the species' entire Montana range, covering 8,000 square miles. For seven years starting in 2002, his volunteer crews set scent traps at more than 1,700 sites in 11 BMUs in western and central Montana that had high black bear numbers. More than 400 hunters, landowners, other citizens, and staff from FWP and other agencies volunteered to help. "All the volunteers were essential, especially the local FWP wildlife biologists," says Mace. "They knew the local landscape and the landowners and

> "The logistics were mind boggling. We had to produce and then store 300 gallons of blood lure."

people who might be interested in volunteering. They made maps where bears were likely to be, got us keys to gates, and arranged campsites for volunteers."

Each July Mace's crews drove, hiked, boated, rode horses, and were helicoptered into sampling sites across the landscape. Some sites were next to roads, while others were deep in remote wilderness. Crews set up hair trap stations consisting of small woodpiles soaked in a foul concoction of fermented blood and liquefied fish, surrounded by a single strand of barbed wire to capture a curious bear's hair. Two weeks after building the lure stations, crews returned to gather the snagged hair samples, which were sent to a private genetics laboratory in British Columbia for analysis.

Coordinating the vast project required extensive preparation and oversight. "The logistics alone were mind boggling," says Chilton. "We had to produce and then store more than 300 gallons of blood lure. We had to feed and house the volunteers, teach them how to use GPS, and above all keep everyone safe. Then we had to deal with all the bear hair we sampled and thousands of envelopes that had to be labeled and mailed to Canada." The vast volumes of data collected and analyzed overloaded Mace's computer. "It's laughable," he says. "I've gone through four hard drives."

From each hair follicle, genetics technicians could identify a bear's species, sex, and genotype (the genetic makeup of each individual animal). Next, researchers obtained hair samples from bears killed by hunters the following fall and sent them to the lab. The last step was a simple math equation. "Let's say we identified 200 different bears through DNA analysis in a BMU," Mace says. "Then let's say we found that 10 of the bears that hunters killed that fall were among those of the 200 identified earlier in the year. That meant the harvest rate for the hunting district was around 5 percent."

Mace was surprised by what the study showed. "To be honest, when we started this project I thought that maybe hunters were overharvesting bears," he says. No longer. Mace now calculates that statewide, an average of about 3 percent of Montana's female black bears are killed by hunters each year—well below the 10 to 15 percent harvest rate he estimates is sustainable. (Mace explains that Montana's sustainable harvest rates are

MONUMENTAL TASK Rick Mace (far right) revised his study to use barbed wire around scent stations to gather bear hair (inset). DNA analysis of hair allowed him to identify individual animals. Setting up the stations and gathering hair required 400-plus volunteers. Below: The volunteer crew that sampled bears in the Yaak Valley, one of 11 study areas spread across the state's black bear range.

likely far lower than the roughly 40 percent in eastern states, where growing seasons for bear foods are longer and the animals reproduce at an earlier age, repopulating faster.) Many Montana BMUs showed harvest rates of less than 1 percent. "Hunters are hardly making a dent in those populations," he says.

Though Mace's study covers only a single year's harvest rate for each BMU, he can roughly estimate past rates by comparing harvest numbers of the study year to those of previous years. "For example, we determined that the harvest rate for female black bears in the Yaak Valley in 2002 was about 1 percent," he says. "The harvest that year was similar to each annual harvest over the previous two decades. That tells me the harvest rate in the Yaak has been roughly 1 percent during that entire time, which is definitely sustainable." Mace acknowledges the imprecision of determining harvest rates by comparing harvest numbers, because the bear population size—an unknown number—could vary from year to year. But he notes that bear populations usually don't fluctuate much. "Knowing at least the harvest rate of one year tells us a lot more than we knew," he says.

BREATHING ROOM

FWP officials are encouraged by the low harvest rates Mace found. FWP Wildlife chief Ken McDonald says the study shows that the number of black bears harvested in Montana each year—about 1,200—is sustainable. "Certainly if harvest began to increase or there were other indications that bear numbers were decreasing, we'd look at some further restrictions, but right now Rick's study shows we've got lots of breathing room," he says.

> "Montana requires hunters to locate and hunt bears on the bears' turf. That means it's tougher to kill a bear here than in other states."

According to McDonald, hunters don't kill a higher proportion of bears because the state does not allow hunters to use bait or dogs to hunt bears. "Montana requires hunters to locate and hunt bears on the bears' turf," he says. "That means it's tougher to kill a bear here than in other states."

Do the low harvest rates suggest Montana should loosen bear hunting regulations, maybe by allowing bait or lengthening seasons? "We're not ruling out any regulation changes, but my hunch is that liberalizing bear hunting wouldn't fly with most Montanans," says McDonald. He adds that Mace's study applies only to existing season structures and may not apply to different seasons, making them less defensible to legal challenges. "We also wouldn't want to do anything that would result in more orphaned cubs in spring. As for using bait, most hunters and nonhunters don't consider that fair chase—for bears, deer, ducks, or other species."

McDonald notes that despite all the information the study produced, it's still only a snapshot of one year for each area where hair samples were collected. "It doesn't tell us if rates are increasing or decreasing. That would give us a better idea of how bear populations are doing. So we'll need to continue DNA studies on some BMUs every ten years or so to follow the harvest rate trend," he says.

Mace will submit a final report on his study later this year. The department plans to revise its bear management strategies with the new information. The update will also include Mace's upcoming estimate of the statewide black bear population and a more precise estimate of sustainable mortality rates.

Unless harvest numbers change drastically, says McDonald, Montanans can be confident their black bears are doing well. "Hunters are generally happy with the opportunities they have, and we're satisfied we're maintaining healthy populations," he says. "The big picture for black bears and black bear hunting and watching in Montana is definitely good."

Black bear range and study areas

SOURCE: MONTANA FWP

BIG STUDY AREA Black bears live mostly in mountainous areas of western and southern Montana (left). To determine harvest rates, Mace's crews set up 1,700 hair trap stations in areas with the highest bear concentrations, covering 8,000 square miles from the Yaak Valley to Red Lodge.

WORTH THE WAIT The study proved that using DNA hair analysis is an effective way to monitor bear populations without having to trap and drug the charismatic animals (right). It also showed the value of long-term research. "It takes years to gather information to determine things like bear harvest rates," says FWP Wildlife chief Ken McDonald. "But the payoff of that investment is enormous, because we'll be using the results of this study to improve bear management for years to come."

"Now Everybody Smile!"

While taking pictures of state parks across Montana, a photographer finally figures out why everyone is so happy.

Photos and story by Kenton Rowe

In 2008 Fish, Wildlife & Parks hired me to photograph the wildlife, scenic beauty, and people in state parks across Montana for one year. (The Parks Division needed the images for posters, brochures, web pages, and interpretive displays.) During the assignment, I drove 6,000 miles across the state, from Whitefish Lake in the west to Medicine Rocks in the east. Shown here are some of my favorites of the 7,000 photographs I took, along with thoughts on the parks, visitors, and staff.

One thing that struck me during my park visits was the enormous range of recreational opportunities—from kayaking at Flathead Lake to trout fishing at Lake Elmo to folfing at Makoshika. I was also surprised that so many state parks were historically and culturally significant, such as Chief Plenty Coups' home and Lewis and Clark's campsite at Travelers' Rest. No wonder FWP recently hired an archaeological expert to care for artifacts at state parks.

One of my most exciting visits was in mid-July during the annual Bannack Days celebration. The park, about 20 miles west of Dillon, is in the middle of nowhere, so I wasn't prepared for the crowds of visitors or

Clockwise from facing page: Cooling off in Grasshopper Creek, at Bannack; sliding at Lake Elmo, in Billings; photographing the rambunctious residents of Greycliff Prairie Dog Town, south of Big Timber; marveling at the eerie underground formations during the annual holiday candlelight tour at Lewis & Clark Caverns, between Bozeman and Butte.

the wide range of activities: old-time dances and mandolin players, families panning for gold and garnets, and craftspeople demonstrating pioneer skills like horseshoeing and candle dipping. Eating—bison burgers, bratwurst, Indian bread, and more—was one of the more popular activities. I watched one boy tear into a cob of corn like it was the last food he'd ever eat. The men just had to try shooting the big 19th-century rifles on display. More than a few walked away from the firing range grimacing in pain from a bruised shoulder. Every hour or so there'd be some new inci-

Kenton Rowe is a photographer in Helena.

Bannack Days visitors tackling plates of biscuits, barbecue pork, and corn on the cob.

dent on the main street, like a gunfight or a stagecoach robbery. Kids seemed to love every bit of it. Some sneaked over to Grasshopper Creek and splashed water at each other in the afternoon sun. I'll bet pioneer kids played in that same stream on hot summer days 150 years ago.

Every park posed a challenge or a surprise. At Lake Elmo, a busy urban park in Billings, I spent hours trying to photograph a family of foxes that had become adept at avoiding people. At Lewis & Clark Caverns, I hadn't realized that wearing a backpack full of photography gear can make it nearly impossible to crawl through some of the tighter tunnels. In one spot I actually got

This page, clockwise from top left: Inspecting a limit of crappies at Tongue River Reservoir, near the Wyoming border; Helena area parks manager Craig Marr, Oryana Sparks of the Montana Conservation Corps, and Montana First Lady Nancy Schweitzer planting trees at Spring Meadow Lake in Helena.

stuck. An even funnier episode was at Sluice Boxes, on Belt Creek about 25 miles southeast of Great Falls. While looking for anglers or hikers to photograph, I came to a spot in the trail where I needed to ford the creek. As I stood there deciding whether to continue, a fellow came down the trail on the opposite side. Assuming no one was around, he stripped to his boxers and waded across. When he reached my side of the creek, we both laughed when I showed him the shots I had taken as he crossed.

Everywhere I went, I met managers and other staff proud of their parks. For example, Makoshika manager Ryan Sokoloski couldn't wait to show me what turned out

to be the most remarkable sight of my entire assignment—northern scorpions that actually glow fluorescent blue under a black light. Sokoloski's seven-year-old son, Hunter, was equally excited to show me fossils. I asked him where we should begin looking. He grinned at my ignorance and replied, "They're all over the place." He was right. Just a few minutes later, we found a rock the size of a dinner plate that contained a perfectly formed leaf fossil. (We left that fossil and others where we found them, as required by state park regulations.)

During my photographic journey, I met and watched people of all types enjoying state parks. I saw kids catch sunnies and

This page, clockwise from top left: Putting new paint on the fee collection box at Pictograph Cave, near Billings; kayaking at Frenchtown Pond, northwest of Missoula; stomping the wooden floorboards of Bannack's Masonic Lodge during an old-fashioned hoedown.

Clockwise from top left: Filling a water bottle at Lost Creek, near Anaconda; taking an outdoor shower at Cooney, south of Columbus; identifying snake species at Pictograph Cave, near Billings; eating a sno-cone at Bannack; enjoying the view from a hiking trail at Makoshika, near Glendive.

perch at Lake Mary Ronan. I joined other visitors in puzzling over the mysterious Indian symbols at Pictograph Cave. At the new Lone Pine Visitor Center, I watched people learn from interpretive displays how to avoid conflicts with bears. And I was constantly impressed by the professionalism and sunny disposition of managers, naturalists, and maintenance crews. In park after park, grounds were tidy, toilets clean, and front desk staff polite and informative.

What amazed me most about all the state parks I visited was how much fun everyone was having. I wondered: Do good-natured people visit and work in state parks? Or do state parks just make people happy?

Based on my observations at state parks across Montana, I'd have to say both.

Take Your Best Shot

Looking for opportunities to photograph people, scenery, and historic and cultural sites? A sample of Montana state parks events this summer where you might find suitable subjects:

ISTOCKPHOTO

FIRST CHILD IN THE WOODS

Beavertail Hill State Park, Children in Nature Walks, Fridays, 8 p.m. The park ranger will lead one-hour tours of this small, scenic park and its birds, flowers, trees, and other natural features. Call (406) 542-5500.

CAVE KNOWLEDGE

Pictograph Cave State Park, Saturdays, 7 p.m. This series of evening talks includes topics such as wildflowers, recent archaeology in the Billings area, stargazing, the "Leave No Trace" ethic, geocaching, and pioneer and Native American history. Call (406) 245-0227.

JUST FOR KIDS

Giant Springs State Park, Sundays, 2 p.m. Fun topics for these youth programs include petting porcupines, learning sign language, and understanding bison. Call (406) 454-5840.

ISTOCKPHOTO

FRIDAYS AT THE CAVERNS

Lewis & Clark Caverns State Park, Fridays, 8 p.m. Fascinating speaker topics include night wildlife, Indian culture, homesteading, saddle making, and understanding Montana through poetry. Call (406) 287-3541.

RIVER STORIES

Missouri Headwaters State Park, Saturdays, 7 p.m. Speakers at this year's summer lecture series and marshmallow toast social will talk about steamboating, fishing, Indian astronomy, historic highway bridges, and more. After the talks, celebrate summer with the popular marshmallow roast. The park provides marshmallows and lemonade. Bring a blanket or lawn chair. Call (406) 994-4042.

Learn what's happening this summer in your local Montana state park by visiting fwp.mt.gov/parks

ACTION AT THE PISHKUN

First Peoples Buffalo Jump State Park, summerlong. *Ulm Buffalo Days*: On Friday, June 12, musician Greg Keeler will play following a gourmet bison dinner; on Saturday, June 13, there will be a fun run, walk, 5K run, car show, remote-control aitplanes, vendors, and other activities. *Summer lecture series*: Saturday and Sunday afternoons. *Youth sleepover camp:* For ages 9 through 12, Saturday nights June 13 and August 8. *Atlatl workshop*: August 28, 29, and 30. Call (406) 866-2217.

SATURDAYS IN A GHOST TOWN

Bannack State Park, Saturdays, times vary. Fun activities for families, including gold panning, bear education, Bannack Days, black-powder shoots, learning about raptors, presentations by historical reenactors, live music, stargazing, and campfires. Call (406) 834-3413.

THE TWO GENTLEMEN OF MAKOSHIKA

Makoshika State Park, July 9, 7 p.m. This year Shakespeare in the Park performs *The Two Gentlemen of Verona*, a classic comedy by the famous playwright featuring love, treachery, deceit, more love, and reconciliation. Call (406) 377-6256.

OVERBOARD Though large rafts can handle even Class V rapids, spills can happen, sending occupants overboard. Water safety experts say wearing a life jacket greatly increases your chances of surviving any boating accident.

RANDY SMITH

In just seconds, Lanny O'Leary's float trip down the Dearborn River in May 2008 turned from an enjoyable outing into a harrowing nightmare. Though the river was high, O'Leary and six friends in three rafts thought they could handle the Dearborn. After all, Jeff Rayman, who was manning O'Leary's boat, was an experienced oarsman. But Bryan Golie, a game warden with Montana Fish, Wildlife & Parks, says the group misjudged both the river and their abilities. "The biggest mistake was going down the river in the first place," says Golie, part of the crew responding to the fatal boating accident. "They had a false sense of security because some of them had gone down the Dearborn a few days earlier and didn't think it would be too bad. But it had rained hard afterward for three days, and the Dearborn was at its peak flow, probably the most dangerous that river can be."

The Dearborn, which rises from the Rocky Mountain Front, flows east through rolling foothills prairie, and then drops into twisting, steep-sided canyons before meeting the Missouri River downstream of Craig. Boaters and anglers generally run the river when flows range from 200 to 600 cubic feet per second (cfs). Anything over 750 cfs is considered dangerous. The flow that day was over 5,000 cfs, the greatest volume recorded in eight years.

The trip began at the U.S. Highway 287 bridge, where the water was brown with runoff and overflowing both banks. The group launched anyway and bounced

A TURN FOR THE WORSE

Last year was the deadliest in a quarter-century for boating accidents. What happened, and how can such tragedies be prevented? **BY NICK GEVOCK**

through one turn after another before reaching a cauldron of rapids known as the Lunch Box. There, O'Leary said afterward, a "wall of water" knocked him, Rayman, and their friend Melody Alvestad into the torrent. The current pushed O'Leary's body into one boulder after another before he could reach the surface, swim to an eddy, and pull himself onto shore. The 56-year-old Helena resident survived and was finally brought to safety seven hours later by a hovercraft that came up from the Missouri after a rescue helicopter failed to reach him.

His friends were not so lucky. Alvestad's body was recovered the next day. She was still wearing her life jacket. Rayman's body was recovered a month later after the river had receded, in a patch of willows on the banks of the Dearborn, about a mile downstream from the accident. He had not been wearing his life jacket. According to O'Leary, Rayman had removed the safety vest early in the trip because he said it made rowing difficult.

Golie, who lives in nearby Cascade, had never seen the Dearborn raging as wildly as that day. "It was out of control," he says. "You could actually hear boulders rolling down the river. I don't know of a time when the force of nature has scared me that much."

The Dearborn deaths were 2 of 14 boating fatalities in 2008, the worst year since 1983, when 19 people died, and double the average of seven per year during the previous decade.

Liz Lodman, FWP boating education

A Bad Year for Boating

14 people died in Montana boating accidents in 2008, the deadliest year since 1983. From FWP incident reports:

JANUARY 8

Location: Flathead Lake, Lake County

Craft: 16-foot fiberglass canoe

Victims: Male, age 64; female, age 62

Incident: Bodies of husband and wife found on south side of Wild Horse Island. Both victims died of hypothermia. Both found wearing PFDs (personal flotation devices, or life jackets). Air temp 42 degrees, water temperature 36 degrees. Canoe capsized for unknown reason.

MAY 25

Location: Dearborn River, Lewis and Clark County

Craft: 14-foot rubber raft

Victims: Male A, age 44; female, age 48

Other occupant: Male B, age 56

Incident: Raft capsized after hitting large rocks. Male A and female drowned. Male B suffered hypothermia and bruises. Male B and female wore PFDs.

A group of seven people in three rafts put in on the Dearborn River. River running 5,000 cfs after several days of rain (median flow: 250 cfs). Victims riding in middle raft capsized after hitting rocks in "Lunch Box" rapids 7 miles from put-in. Male A rowing raft at the time. Male A initially wearing a PFD but removed it, saying it hindered rowing. Female victim last seen floating face up and unresponsive in an eddy. Male B reached shore and was rescued by a hovercraft. Female victim's body recovered next day. Male A's body recovered June 20.

coordinator, can't explain last year's steep fatality increase. Much of Montana had above-average mountain snowpack that produced heavy spring runoff on the Dearborn and several other rivers where accidents occurred. But in most incidents, river conditions were no different in 2008 than in previous years. Boaters simply—and tragically—overlooked basic safety rules that could have prevented accidents or at least reduced the number of fatalities. "More than anything else, it's life jackets," says Lodman. "If people would wear their life jackets, they'd have a much better chance of staying alive."

RECOGNIZING LIMITATIONS

How did other boaters die last year? On Flathead Lake, a man age 65 drowned after falling from his sailboat. A 53-year-old man fishing the East Fork of the Bitterroot River fell into the water and drowned after his raft hit a logjam. On the Stillwater River, a 50-year-old woman drowned when the raft she was in wrapped around a bridge pillar, tossing all occupants into the water. A 36-year-old kayaker was found dead on the Madison River after his craft flipped and he was pinned against a downed log. (See side columns beginning this page for FWP incident reports for all 2008 boating fatalities.)

Some boating fatalities are unpreventable. "Sometimes people drown and there is nothing they could have done," says Lodman. But in other instances, floaters disregard a river's unsafe conditions and put themselves at great risk. That's especially true during spring runoff, when melting mountain snows swell streams and rivers into raging torrents.

Lodman says all boaters need to recognize the limits of their craft as well as know their abilities to read water and steer their boat in hazardous conditions. Another mistake boaters commonly make is overestimating their ability to swim—especially in rivers. "Even strong, experienced swimmers can be pulled by the current and held against a submerged log," Lodman says. "The force of moving water is incredible."

Water is also unpredictable. River flows can double overnight from heavy rains or snowmelt. New hazards constantly emerge. "Just because you floated

PHOTOS BY RYAN HALL/GREAT FALLS TRIBUNE

Nick Gevock is a freelance writer and a reporter for The Montana Standard *in Butte.*

NEW LIFE JACKETS ARE SLEEK AND COMFORTABLE

A new generation of inflatable life vests is replacing the traditional bulky pillowlike models many boaters have used for decades. The new life vests are thin, comfortable, and don't restrict arm movement. The old orange puffy vests can be cumbersome and, unless fitted properly, rise up over the head of wearers in the water.

"These new models aren't your grandpa's life jacket," says Liz Lodman, FWP boating education coordinator. "People don't want to wear those uncomfortable traditional bulky life jackets. That's why the new ones are thin and sleek. You hardly know you have one on."

Most new models inflate when the wearer pulls a tab that opens a CO_2 cartridge. Some vests inflate automatically when hydrostatic water pressure engages the cartridge, which can save lives if the wearer is knocked unconscious. "Because the inflation happens after you enter the water, most of these new models are so light and slim you don't even know you're wearing them," says Lodman.

Prices for new vests, in styles and types customized for boaters, anglers, hunters, and paddlers, range from roughly $100 to $300.

TO THE RESCUE An experienced kayaker is brought safely to shore after capsizing above Rainbow Dam on the Missouri River in Great Falls in April 2009. Cascade Search and Rescue, Black Eagle Volunteer Fire Department, Great Falls Emergency Services, and FWP contributed to the rescue.

it yesterday doesn't mean there won't be dangers there today," says Ron Jendro, Recreation Program manager for FWP Enforcement. "You should always be looking up ahead for new obstacles." Many rivers contain logjams and downed trees that can knock boaters from their craft and pin them underwater. Submerged trees called "srrainers" sit just under the water surface and can tip a boat.

Lakes and reservoirs also can change quickly, especially big ones like Flathead, Canyon Ferry, and Fort Peck. "You've got big expanses of warer, long distances to shore, and open areas with big waves when winds come up," says Mike Korn, assistant chief of FWP Enforcement. "You're approaching conditions like those on the open ocean, and many people get out on our big lakes and reservoirs and are not familiar with those conditions. When something goes wrong, they often find themselves grossly unprepared."

Hypothermia is as big a threat to boaters as drowning. The condition is caused when internal body temperature drops so low that bodily functrions slow and eventually stop. According to the International Life Saving Federation, cold water removes heat from the body 25 times faster than cold air. Boaters have died of hypothermia even in midsummer, says Lodman. Because many Monrana rivers and lakes stay cold throughout the year, early summer is especially dangerous. Air temperatures can reach the 80s while river water fed by melring snowpack stays down in the 40s.

Hypothermia can take hold even if boaters don't capsize. Golie recalls one mild, late-spring day when two people became hypothermic while canoeing. Though the air was warm, the water was frigid, and the canoeisrs became wet as waves splashed into the craft. They began to suffer hypothermia and could no longer paddle. Another floater passed the stricken pair and called for help. When Golie arrived, the two canoeists were frozen nearly stiff. "They couldn't move their hands, rhey couldn't move their feet—they couldn't even talk," he says.

Boaring officials have recently recognized a phenomenon called "cold water immersion" that also contributes to boating deaths. When suddenly immersed in cold warer, people often hyperventilate and inhale water. The cold water can also rob muscles of rheir function, causing even strong swimmers to drown within minutes.

JUNE 15

Location: East Fork Bitterroot River, Ravalli County

Craft: 13-foot rubber raft

Victim: Male, age 53

Other occupant: Female, age 54

Incident: Male victim drowned. Female suffered hypothermia and bruises. PFDs available but not worn. The couple was fishing and drifting when the raft hit a logjam and they fell overboard. Female was pulled underwater and then under a log. She was rescued by two bystanders. Male suspected to have hit his head and drowned. Body recovered 1 mile downstream.

JUNE 28

Location: Blackfoot River, Missoula County

Craft: 2-seat raft

Victim: Male A, age 27

Other occupants: Male B, age 31; female, age 38

Incident: Raft capsized at approximately 7 p.m. one-half mile north of Bonner, and Male A drowned. No PFDs worn. The female swam to shore. Male B stranded on a gravel bar and rescued. Male B stated that male A had a prosthetic leg and appeared to have difficulty getting to shore. The river was flowing at 4,020 cfs, 50 percent above median flow of 2,660 cfs. Body of Male A was recovered on July 10, 2008, on the Clark Fork River on a small island near Kelly Island after river levels had dropped.

JULY 14

Location: Stillwater River, Stillwater County

Craft: 14-foot rubber raft

Victim: Female, age 50

Other occupants: Five others

Incident: Raft capsized going over Beartooth Drop when the current forced the raft into a bridge pillar, where it wrapped. All occupants reached shore except a dog tied to the raft frame and the victim, who was held underwater for approximately 5 minutes and drowned. Witnesses saw her surface and float face down. She was recovered 3 miles downstream.

JULY 16

Location: Tongue River Reservoir, Big Horn County

Craft: 11-foot open aluminum motorboat

Victim: Female, age 47

Incident: Motorboat caught in foul weather and victim drowned. PFD available but not worn. Victim fishing when a strong storm with high winds, rain, and golf ball–sized hail set in. Unknown if boat capsized or swamped. Body recovered the next day.

AUGUST 15

Location: Flathead Lake, Lake County

Craft: Unknown

Victim: Male, age 70

Rescuer: Two others

Incident: Victim dove into the lake from the boat but never resurfaced. Body was recovered four days later at a depth of 251 feet.

AUGUST 18

Location: Flathead Lake, Lake County

Craft: Sailboat

Victim: Male, age 65

Incident: Victim appeared to have drowned. No PFD worn. Unmanned sailboat drifted to shore of Big Arm, where a homeowner called authorities. Pilot spotted victim in Big Arm Bay that evening, and body was recovered.

AUGUST 24

Location: Ennis Lake, Madison County

Craft: 19-foot fiberglass motorboat

Victim: Female, age 53

Rescuer: Male, age 56; female youth

Incident: Victim was waterskiing and, while boat was making a turn, crashed into rocks on shoreline, suffering internal injuries. No PFD worn.

AUGUST 31

Location: Deadman's Basin, Wheatland County

Craft: 12-foot aluminum motorboat

Victim: Male, age 54

Incident: Victim fell overboard and drowned. No PFD worn. Blood alcohol content of .313. Witness on shore observed the accident and recovered the victim's body.

LIFE JACKETS SAVE LIVES

Montana safety experts say most boating accidents share common elements. The biggest two are operator inexperience and inattention. "Either people didn't know what they were doing or they were distracted by something else and didn't see the danger," says Jendro. Alcohol also contributes to fatalities. Montana law prohibits anyone from operating a motorboat while intoxicated, but Jendro says drinking while boating is common. "People don't realize that alcohol on the water is like alcohol on the road," he says. "It impairs your balance and judgment, blurs your vision, and slows down your reaction time."

Should Montana do more to protect boaters from accidents and death? Lodman says many states require mandatory motorboat operator education, while Montana law limits education requirements to 13- and 14-year-olds (kids age 12 and younger may not operate powerboats alone). She says the Montana legislature could require that everyone in a boat wear a life jacket. (Currently there must be a U.S. Coast Guard–approved life jacket in the boat for each occupant, but only children age 11 and younger are required to wear one.) Lawmakers could also require FWP to close rivers to public access during high water. Lodman doubts any of these measures will happen soon. "The overall attitude in Montana has been that boating involves risks, just like with many other outdoor activities, and people need to understand those risks and take responsibility for their actions," she says. "As for mandatory motorboat education, more than half our fatalities are from rafts, kayaks, and other nonmotorized boats, so it would miss a large share of Montana boaters."

> "People don't realize that alcohol on the water is like alcohol on the road."

Is there anything boaters can do to reduce the chance of becoming a fatality statistic? "Know the water you're going to be on, know your abilities, and wear your life jacket," Jendro says. "Those things could prevent 75 percent of our fatalities." According to Virgil Chambers, director of the National Safe Boating Council, most of the roughly 700 people

MONTANA FWP

BEACHED Boating fatalities often occur when operators overestimate their ability to handle the craft or misjudge changing conditions such as high winds on large lakes and reservoirs. Above: A boat operator lost control and slammed into the shore of Holter Lake. Right: A boat ran into a dock at Flathead Lake before flipping.

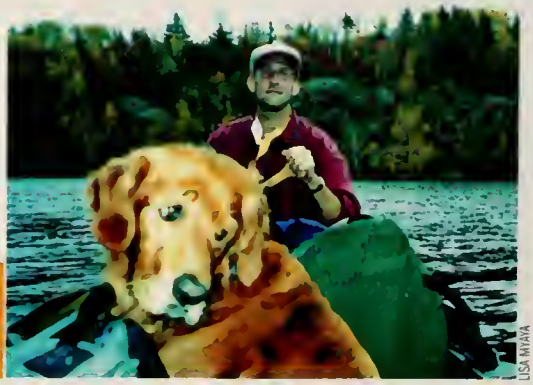
IN WAY OVER OUR HEADS

Last year when I read of the tragic rafting accident on the Dearborn River, I looked over at my wife, Lisa, and thought, "That was almost us."

In 2006, I'd made a similar error on the Dearborn that could have cost us our lives. Like the rafters last year, I'd underestimated the river's danger and overestimated my boating ability.

When we reached the Dearborn River put-in, the water was high, cold, and muddy, though not at flood stage. It had rained for about 24 hours straight, so that morning I'd checked the flow on the Internet: 944 cfs, more than three times normal. I had only limited experience canoeing rivers, but I'd paddled large wilderness lakes for years. I figured we'd be fine.

By the third bend in the river, I could tell the Dearborn was wilder than anything I'd canoed pre-



LISA MYAYA

NO PREPARATION FOR A MONTANA RIVER Canoeing a wilderness lake in Canada before the Dearborn accident. Note the unsafe absence of a life vest.

MONTANA FWP

who die throughout the United States in boating accidents would likely survive if they wore a life jacket. "When people fall in a lake or river unexpectedly—I don't care if they can swim well or not—it's the element of surprise, and they often go into shock," Chambers says. "With a life jacket on, you can stay on top of the water, right yourself, and get out of the water or get rescued faster."

The tragedy of a man who fell into Deadman's Basin last August near Harlowton is an example. The 54-year-old had been drinking heavily, with a blood alcohol content more than three times the legal limit, when he fell from his boat into the lake. By the time someone watching the incident reached the victim to help, he had drowned.

"The intoxication was likely a huge factor, but I think if he'd been wearing his life jacket, he would have floated long enough for the other guy to save him," Lodman says.

Life jackets also insulate against cold water. The U.S. Coast Guard now promotes what it calls the "50/50/50 Rule: A person in 50-degree water for 50 minutes has a 50 percent better chance of surviving with a life jacket than without one.

Life jackets are especially important on moving water, Golie adds. When someone in a raft or canoe is thrown into the water, a life jacket can help the person get to the surface and swim toward calm water along the edge, where they can at least keep from getting sucked under or pulled downstream. "A life jacket is the seat belt of a boat," says the game warden. "It at least gives you a chance to survive."

SEPTEMBER 13

Location: Madison River, Madison County

Craft: 8-foot kayak

Victim: Male, age 38

Summary: Victim fell overboard, was pinned on a log, and drowned or died of trauma. PFD was worn. Victim and another paddler put in on the Madison River below Earthquake Lake. River was flowing at 3,200 cfs (median flow 850 cfs). At Earthquake Rapids the victim rolled his kayak over and tried several times to roll upright. Unable to do so, he pulled his kayak skirt and began to swim. He missed a number of throw bags deployed by people on shore. Victim was swept into a vertical log in midstream. While pinned there, he was stripped of his helmet, sprayskirt, and PFD. His paddling partner exited his kayak and tried to swim toward the victim. Before the partner could reach the log, the victim was swept downstream floating face down. He was recovered downstream in calmer waters.

OCTOBER 6

Location: Flathead Lake, Flathead County

Craft: Personal watercraft

Victim: Male, age 43

Summary: Details unknown. PFD use unknown. Victim fishing by himself and may have drowned. Body found on shore at Woods Bay.

viously. On the seventh turn we shot through 3-foot-high standing waves, took water over the bow, and had to bail the canoe. Lisa, who also had never paddled a river so rough, asked, "Are we okay?" By then we were several miles into the 17-mile trip. I figured we had no other choice but to continue. I lied and said everything was fine.

With each turn it got harder to keep the canoe from slamming into the limestone cliffs or swamping in rapids. After managing to get us through a particularly turbulent turn, I knew that if conditions worsened I'd be unable to keep the canoe afloat. Then we heard a dull roar ahead and rounded a bend to see 200 yards of boiling river known as the Boulder Garden. I had no time to pull to shore before the canoe plunged into 5-foot-tall waves that crashed into Lisa's chest, knocking her into the river then upending the canoe. Gasping from the cold water, I tumbled downstream, bouncing from one boulder to another before surfacing in an eddy. I pulled myself ashore and watched the canoe wrap around a boulder and the wooden thwarts and gunnels snap like pencils.

I called out for my wife, whom I'd seen only as a wet blur while I'd been swept down the rapids. No response. I crawled up a cliff, wincing from a softball-sized bruise in my right thigh, and called again. I heard her faint reply upstream. She was shaken but fine, as was our dog. We climbed out of the canyon, found a dirt road, and limped back several miles to the car. We'd lost our canoe, a camera, and all my fly-fishing gear but considered ourselves lucky. Despite our poor judgment that day, we'd at least been smart enough to wear our life vests.

—Tom Dickson, Editor

LEARN MORE ABOUT BOATING SAFELY

FWP provides an on-line guide containing everything you need to know about boating laws and safety. Look for "The Handbook of Montana Boating Laws and Responsibilities" and boating safety courses at **fwp.mt.gov/education/outdoorrec/boated.html.**

O'NEAL'S LONG JOHNS

BY LOUIS LAVOIE

ILLUSTRATIONS BY MIKE MORAN

Many suspect stories have been written about the Old Saloon in Emigrant, but I swear this yarn is true—at least some of it.

Phil and his graduate students were dead sick of the month-long drudgery of mapping the geology of the Absaroka Range up behind Mineral Mountain. Worse still, they'd been out of beer for a week. When the boss mentioned going to town, they were headed down the mountain to the truck before he could finish the sentence. The nearest beer was in the hamlet of Emigrant, where, in less than an hour, they were walking through the doors of the Old Saloon. They took a table between the elk head on the south wall and the jury of five buck heads lined up neatly near the back on the north wall. Phil called for burgers and a round of beers, put his feet up on the iron railing surrounding the wood stove, and struck up a conversation with a local ranch hand.

Dwayne "Smitty" Smith was the oldest person to frequent the place. He'd been drinking there for more than 60 years, and his dad, Old Man Smith, went back another 30 before that. The Old Saloon was called Armstrong's back then. Abe Armstrong opened it in 1902 on the ashes of a previous saloon. The Smith family tradition started in 1919 after the Great War, when the old man claimed a stool at the end of the bar. It was almost like a vacation home whenever he could get off the ranch. Worked fine 'til 1921, when Prohibition forced Abe to close. That is, "forced to close" as far as the feds knew. In fact, after a judicious interval, Armstrong's discreetly reopened and operated "informally" for 41 years. Then, with Prohibition long gone, the feds, the state, the county, and just about every other level of government imaginable began sniffing around for tax revenue. So the place "reopened" all legal like in 1962. Old Man Smith didn't even change stools. When he died a few years later, his oldest—who'd been a regular at the tavern ever since Truman beat Dewey—took over the spot and has been there ever since.

Smitty was anxious to talk. When Phil asked about the elk head, Smitty allowed as how he'd shot it behind the saloon 30 years previous and that it had knocked down the back door and run right through the place before collapsing where its head now graced the wall. Andy came round the bar, delivered another clutch of beers, and laughed. "Smitty, you never shot an elk in your life."

"Did so, an thar he is."

"Smitty, that elk died before you were born."

"Well, maybe it wasn't that elk, but there's an elk head around here somewhere thet's mine."

Andy rolled his eyes and returned to the bar as Smitty

continued, "Use to be a lotta elk around here, but traffic's driven 'em away."

Phil was in heaven. With the glow of a second beer relaxing everyone, he leaned back and saw a set of red long johns nailed spread-eagle to the ceiling near the back of the saloon. "What's the story behind those long johns up there?"

Slightly moving his head, Smitty looked upward for a moment, sighed, rubbed his eyes, and began.

It was 1956, and the weather that autumn in Paradise Valley was downright balmy. The cattle were safely pastured, and the ranch hands had little to do. Smitty was sitting in front of the bunkhouse enjoying the soft sun and idly wondering about hunting; pretty soon elk would be coming down out of Yellowstone National Park. Maybe he and Bobby O'Neal should think about shooting one. Bobby snorted that there wasn't much sport in that, "Might as well go out an' rope 'em." Cowboy scorn inspired Smitty.

"Wal, we might go after that griz thet's been seen over behind Chico. Don't s'pose he's denned up yet."

Bobby agreed, "They say he's a big un, too."

For a few minutes neither said anything more. Then they got up together, fetched some rifles from the bunkhouse, had the cook bundle up three day's food, tied their blanket rolls and grub on a pack horse, and lazily rode out of sight down the valley.

A word here about their firearms. Contrary to what you see in old Hollywood westerns, they carried no pistols. Smitty packed a Winchester .30-.30 saddle gun that Bobby rightly scoffed at for grizzly hunting. A large grizzly bear would only be irritated by such light stings, he said, and no one in his right mind would go out and knowingly irritate a griz. Bobby was more conservative, borrowing from the ranch a .325 WSM moose gun someone had brought down from Alaska a few months before. He believed that serious hunting called for serious firepower.

In a few hours they came to a spring and decided to make camp. The sun was just below the ridge of the Gallatins on the west side of the valley, and it was cooling fast enough to hurry their fire building. Supper and camp were spartan and casual as they speculated on the bear they hoped to take. An hour passed, and the pair sat and watched the fire burn down into intense embers that shimmered among the tangle of surviving ash-white logs. The conversation slowly died, and each retreated into his thoughts. Another spell of silence, then the chill broke the trance.

"Cold! I'm turning in."

"Me too."

Bobby stripped to his underwear, rolled his shirt and trousers into a pillow, and disappeared into his blankets. Smitty slept in his clothes, remarking on Bobby's fortitude.

Bobby responded, "Hell, don't need no stiff jeans and jacket to stay warm under the blankets as long as I've got on these here long johns. Keep yer socks on and it's as good as being in the fire. Horses all set?"

"Yep."

"G'nite."

"Nite."

The two cowboys lay on their backs and stared into the silent night sky for a moment, then rolled on their sides and retreated turtlelike into their blanket rolls and slept. The night quickly passed to dawn, pulling them awake and hustling them to rekindle the fire among the still-warm ashes. Bobby scampered around the campsite picking up kindling to reignite the fire, looking like a scrawny devil in his crimson long johns, before quickly pulling on his jeans, boots, shirt, and jacket. Smitty checked the horses and pulled from the saddlebags some cold ham and biscuits for

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Louis Lavoie, a retired physicist, lives in Minnesota and frequently visits Montana's Paradise Valley. New Jersey illustrator Mike Moran's artwork has appeared in national publications including the New York Times *and* Harvard Business Review.

breakfast. By eight they were well on their way again.

Approaching Emigrant Creek, they came upon a small ranch and asked about the bear. Sophie Bauer said sure enough there was a big fella that had been bothering the stock, even sniffed around their log home a couple of nights before, and like as near drove the dogs wild. Her husband got off a shot, but the bear just disappeared into the night. She thought it might be bedded down somewhere high up the stream. The cowboys thanked her and continued to the creek, turning their horses eastward upstream and gingerly picking their way. It quickly became tough going, so they dismounted and made an early camp, intending to search the area upstream for a couple of miles on foot. What they didn't know, but would soon enough find out, was that a mule deer lay dead and half-eaten less than a mile up Emigrant Creek. They had made camp near that ol' griz's lunch table.

The horses seemed a tad uneasy, but that was recognized only in looking back the next day. They agreed to ascend the creek on opposite sides, separated by a few hundred yards. It was steep and difficult going, and both worked up a sweat—especially Bobby, who was still wearing his wool long johns. After an hour he was so hot he stopped at an inviting pool, stripped, and settled into the icy water.

Unfortunately, where Bobby had stopped to cool down was just a few yards from where the griz had left its mule deer—and the bear was on its way back for a snack. The wind momentarily carried Bobby's fragrance right to the bruin's nose, and then all hell broke loose. With a snarling roar, it headed straight at Bobby. Without actually seeing the bear, he knew he only had time to jump out of the water and scramble up the nearest tree. The bear got to the cottonwood only seconds behind, but Bobby climbed with particular inspiration, and some brilliance as well. The bear would have gotten him had he not climbed squirrel-like, spiraling upward trying to keep the tree trunk between them. No Olympian ever performed better. The bear was furiously thrashing about the base, and even attempted a couple of climbs. This drove Bobby even higher. The bear, looking up at the interloper, roared with rage and frustration. He backed down the tree and tore up the ground. Then he encountered Bobby's useless moose gun as well as his long johns and other clothes. The scent drove the griz crazy, and he grabbed the long johns in his jaws and violently shook them in the air.

Meanwhile, Smitty had heard the ruckus, and fearing the worst, dashed as fast as he could to save his friend. Coming through the trees, all he could see was the huge bear violently shaking poor Bobby, who apparently had been so ravaged by the griz that the only clothes left on him were the long johns. The single crack of the .30-.30 brought the bear about. How the angry griz could have been more irritated than before is hard to imagine, but it was, and the wound merely announced Smitty as a highly unwelcome additional insult to the dignity of his table.

"They say you can't outrun a grizzly," Smitty told his audience, who by this time had pulled their chairs up around his bar stool. "Wal, I can tell ya, yes you can! Course it was close there for a minute 'til I fell over a cliff into some tree tops, but I definitely left that ol' griz behind. By the time I got back to camp—without my rifle, and without poor old Bobby—I was darn sorry 'bout my friend's terrible fate.

"I rode back down the creek to the Bauers', where George loaned me a bigger gun, and he and I returned to get Bobby's remains. We shot the bear not far from our last camp, and he was still carrying Bobby's long johns in his mouth. We searched for Bobby, but found nothing. I figgered the bear musta et 'im up. That ride down to Emigrant was the saddest march I ever made, especially with Bobby's only remains slung so red and lifelike over the saddle horn.

"I tied up at Armstrong's and took 'Bobby' in. After the necessary reports, we discussed how to memorialize him. Abe said why not tack him to the ceiling, kinda like he was on his way to heaven. So up he went. And there he is." Smitty glanced upward and went silent.

"But what really happened to Bobby?" Phil asked.

Andy finished the story from behind the bar: "Bobby sat up in that tree shivering all night. He heard Smitty's shot, heard the bear's snarl and charge, and then silence. Figured Smitty got eaten. A couple of hours later, he heard two more shots way down the creek and figured somebody musta got the bear. But he wasn't about to come down 'til he was dead sure the grizzly wasn't around. About dawn he eased himself to the ground, found his boots, and walked out, bear naked so to speak, to the Bauers' cabin where he scared the heck out of Mrs. Bauer when she opened the door to his knock. George threw a blanket around him and they worked all day to get him warmed up. For the rest of his life he was known as 'Bear' O'Neal. Funny thing though, he never entered Armstrong's after that. Said he was afraid to see his body tacked up overhead."

Well, if you go to the Old Saloon in Emigrant, Montana, you can see O'Neal's ghost tacked up there—or at least see his red long johns. I swear this is the truth—or at least some of it.

CREATING THE WILDLIFE-FRIENDLY FENCE

FWP provides instruction on how to modify fencing to prevent elk, deer, and pronghorn from injuring themselves and damaging private property. BY CHRISTINE PAIGE

While Steve Primm was driving through the Madison Valley south of Ennis one recent fall, a flash of white caught his eye. Primm, who lives nearby, had seen a pronghorn buck zigzagging next to a fence in a way that made him pause. He pulled onto a side road and found the antelope wrapped in barbed wire. Using his fence cutters, he snipped a wire near the buck's front leg. "That's all it took," Primm says. "He thrashed a bit, freed himself, and ran away.

Other wild animals often are not so lucky. Elk, deer, pronghorn, and other large mammals are injured or killed in Montana each year running into fences or entangling themselves in wire. And landowners face costly and time-consuming repairs fixing barbed wire and woven wire (4- to 6-inch-square mesh) damaged by wildlife. A new booklet by Montana Fish, Wildlife & Parks offers livestock growers and others practical solutions for modifying fences at problem sites to help wildlife while saving money in fence repairs.

STEVE PRIMM

STUCK BUCK A Madison Valley resident was able to cut this antelope free. The buck survived, but in many cases entangled wildlife don't fare so well.

Entangled and blocked

Large ungulates such as deer, elk, moose, mountain sheep, and pronghorn are capable of jumping fences, but they occasionally get

BYE-BYE BARBS Volunteers from the Rocky Mountain Elk Foundation and Montana Conservation Corps remove old, unused fence near Missoula. Some fencing poses hazards to wildlife, especially along migration routes. A new FWP booklet offers tips for sensible solutions at trouble spots.

PAUL QUENEAU

caught in barbed wire. "Often the top strand is too high," says Craig Jourdonnais, FWP wildlife biologist for the Bitterroot Valley. "The problem is compounded in late winter, when elk and deer are at their weakest and become more vulnerable to being caught in the wires."

Fences also obstruct daily and seasonal movements of wildlife. Woven-wire fences often block fawns and calves from following adult deer and elk able to jump over the barriers. Woven wire also obstructs animals such as bears and bobcats unable to leap fences and too large to slip through the mesh. Fences pose particular problems for pronghorn. Although capable of leaping over a fence, pronghorn usually crawl under. Woven-wire fences can completely block pronghorn movement.

Sensible solutions

Most fences don't cause problems for wildlife. But some sections, especially where wildlife regularly move daily or seasonally, can benefit from minor modifications.

> "When nobody is putting pressure on them, even the big bulls go under with no problem."

Recently FWP produced a 41-page booklet, "A Landowner's Guide to Wildlife Friendly Fences: How to Build Fence with Wildlife in Mind," that offers sensible solutions. With photographs and detailed illustrations, the booklet explains how to modify fences in trouble spots to contain livestock while still allowing wildlife to move freely through important habitats, such as gullies, ridges, wetlands, and streams. Examples:

- Lower the top strand of barbed wire and raise the bottom wire.
- Replace the top barbed wire with a smooth wire or rail.
- Modify sections of fence so a top rail or wire can be temporarily lowered at deer, elk, and moose trails during seasonal migrations, and a bottom wire can be raised so calves, fawns, or pronghorn can slip underneath.
- Temporarily lay down sections of fence during seasonal elk, deer, and pronghorn migration when livestock aren't present.
- Replace the top strand with highly visible white poly-wire or attach short pieces of white vinyl "undersill" siding strips (available at most home improvement centers) to fence wires in areas where wildlife collisions or entanglements are common.

Electric fencing is another way to keep livestock in place while allowing wildlife to move freely. Juanita Vero, the fifth-generation owner and manager of the E Bar L guest ranch in the Blackfoot Valley, has fixed her share of damaged fence. On the ranch, 80 head of horses share 4,000 acres of range with large numbers of deer and elk. One half-mile section of the ranch's traditional barbed wire fence required frequent maintenance where it crossed a route that elk used daily. The large animals often stretched and collapsed wires as they lum-

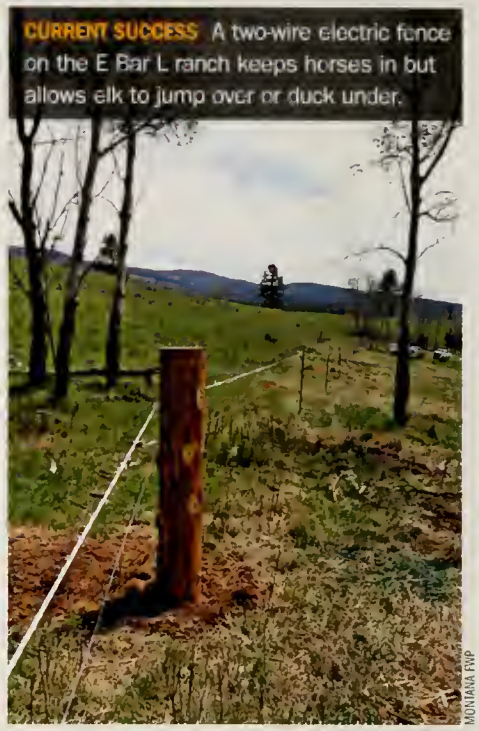
bered over the fence. The Vero family sought help from the local FWP wildlife biologist, Jay Kolbe.

Under an agreement in which Kolbe evaluated the fence design at the trouble spot and FWP split costs and labor with the ranch, department crews and the Veros built a two-wire electrified fence, spaced between timber and fiberglass posts. The top wire is a high-visibility electric wire. The lower wire, hung several inches below the top one, is standard 12.5-gauge high-tensile steel that conducts no current. While the fence contains horses, elk easily pass over or underneath. "When nobody is putting pressure on them, even the big bulls go under with no problem" says Vero.

Elsewhere on the ranch, the family has successfully placed temporary single-strand electric fencing to divide pastures into smaller units. That allows them to control where horses graze, allows wildlife of all types to pass freely, and eliminates fence repair.

Ultimately, any fence must be functional and meet a landowner's needs. Many property damage problems and wildlife injuries can be prevented with modifications on only a short section of fence. By installing wildlife-friendly fencing, a landowner helps Montana's elk, deer, pronghorn, and other wild animals move freely across the landscape without doing damage to fences—or themselves.

Christine Paige is an independent wildlife biologist and science writer who lives in the Bitterroot Valley. Additional research contributed by Bryce Andrews.



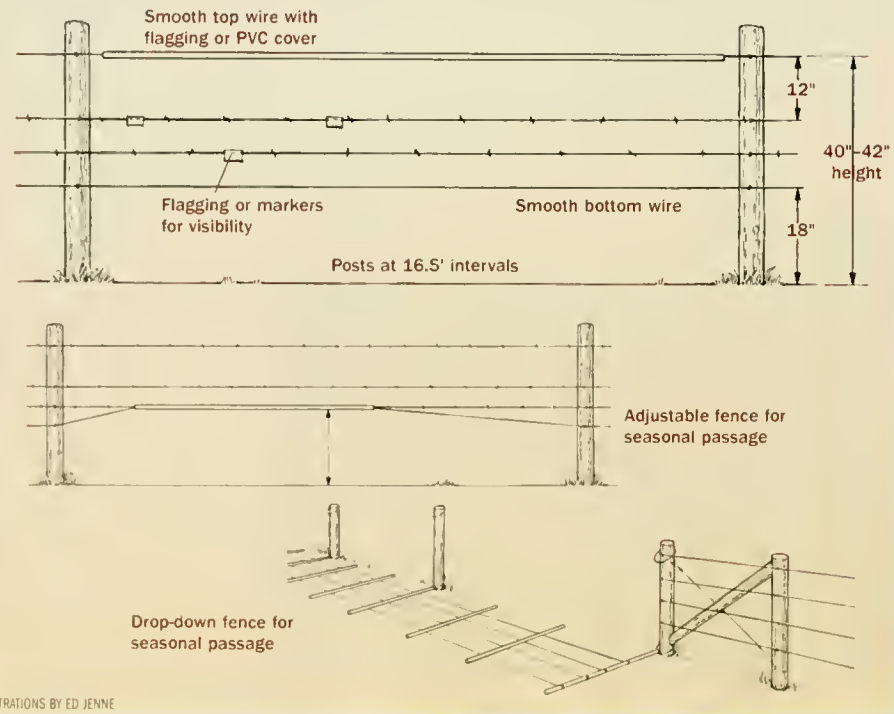
CURRENT SUCCESS A two-wire electric fence on the E Bar L ranch keeps horses in but allows elk to jump over or duck under.

MONTANA FWP

Friendly Fences

Thinking of putting up new fencing on your property or adjusting existing fences? Wildlife-friendly fences:

- are low enough to jump over—top is no more than 42 inches above the ground;
- are high enough to crawl under—bottom is at least 18 inches above the ground;
- won't tangle legs—have at least 12 inches between top wires;
- are well-maintained, with no loose wires;
- include a smooth wire or rail on the top and a smooth wire on the bottom;
- are adorned to be visible to running animals;
- include gates and drop-downs where wildlife concentrate and cross.



ILLUSTRATIONS BY ED JENNE

YOURS FOR THE ASKING

For a free copy of "A Landowner's Guide to Wildlife Friendly Fences: How to Build Fence with Wildlife in Mind," contact any FWP office or Joe Weigand, who coordinates the FWP Landowner/Wildlife Resource Program, at (406) 444-3065 or joweigand@mt.gov. Download an electronic copy at fwp.mt.gov/wildthings/livingwwildlife/tips.html (look in the "Tips" box). The 41-page guide contains information and illustrations on specific fencing situations. Weigand says the guide has generated interest across the United States as well as in Canada, Mexico, Argentina, Chile, and Australia.

TIGER BEETLE

Cicindela spp.

By Bryce Christiaens

While hiking in the Reservation Divide Roadless Area on a sunny day this past spring, I came to a place where the receding snow had left a bare strip of disturbed soil. Along the edge of the snow, brightly colored insects the size of grasshoppers flitted in front of me. They were tiger beetles. These particular insects were *Cicindela depressula*, one of 25 tiger beetle species in Montana. As a self-described Cicindelaophile, I was delighted to see the little insects.

DESCRIPTION Tiger beetles are easily recognizable by their bulging eyes and especially large mandibles (jaws). They range from ⅜ to ⅝ inch long. Adults of all species look similar, with long bodies and long thin legs, large heads, and markings of various shapes on the wing covers. Stacks of reflective plates layered over pigment create a metallic, iridescent sheen, especially on the underside of the body. The larvae are easily distinguished from those of other insects by the large, forward-facing hooks on their back. Entomologists differentiate tiger beetle species by the insects' different habitats, body shapes, and wing cover markings. Tiger beetles range in color from bright green to purple, blue, bronze, brown, and black.

DISTRIBUTION AND HABITAT Tiger beetles can be found practically everywhere in Montana, from the snowline along the Bitterroot Divide to the central prairies to the badlands of Makoshika. The insects prefer open habitat where they can run down prey. Sandy soils along rivers and lakes, open prairie, alkali flats, and disturbed areas provide sufficient hunting areas for tiger beetles. Trails provide ideal habitat, so if you're hiking anywhere between May and September, you're bound to see tiger beetles along the path if you look closely.

BEHAVIOR Adult tiger beetles are active predators that rely on sight and speed to catch prey. When hunting, the beetles run in short spurts, stop to look for moving prey, and then sprint in that direction. The frequent pauses are needed because tiger beetles become blind while running. They actually move too fast for their eyes to gather enough photons to create an image of the prey. One species, *Cicindela tranquebarica*, can move at the amazing pace of 29 body lengths per second (that's 148 mph if you're a grizzly bear). During hot weather, tiger beetles ambush prey by waiting in shady spots and attacking passing flies, caterpillars, and other beetles. Tiger beetle larvae are also aggressive predators. The large-headed, hump-backed grubs flip backwards to capture other insects that stray too near, using the large hooks on their backs as anchors to pull themselves and their prey into the safety of a burrow. Tiger beetles fly, but only to escape predators and not to pursue prey.

BREEDING Male tiger beetles mate with great ferocity. They attempt to copulate with any tiger beetle they meet but can hold on to females only. A female has an indentation on each side of her thorax (called a "coupling sulcus") that matches only the mandibles of the males of her species. Because males lack these grooves, another male will slip off. And a male of another tiger beetle species can't get his mandibles to "fit" the grooves on females of a different species long enough to mate. After mating, females deposit up to 15 eggs, one at a time, at different locations.

STATUS In Montana, two tiger beetles are potential species of concern. Only a few *Cicindela cuprascens* and *Cicindela limbata* have been found here. However, both species have healthy populations in neighboring states and provinces.

For a checklist of Montana's tiger beetles, visit the on-line field guide at http://fieldguide.mt.gov. For more information on tiger beetles, check out *Tiger Beetles of Alberta*, by John Acorn, and *A Field Guide to the Tiger Beetles of the United States and Canada*, by David L. Pearson, C. Barry Knisley, and Charles J. Kazilek.

ISTOCKPHOTO.COM

Bryce Christiaens is an amateur entomologist and a farmer who grows native flowers in Arlee.

PARTING SHOT

JUST BARELY A bighorn ewe easily leaps a fence while her lamb struggles to clear the top wire. See page 34 to learn how FWP is helping landowners modify fences to reduce wildlife entanglements. Photo by Tom Reichner

Montana Fish, Wildlife & Parks

On-line: **fwp.mt.gov/mtoutdoors** Subscriptions: **800-678-6668**

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